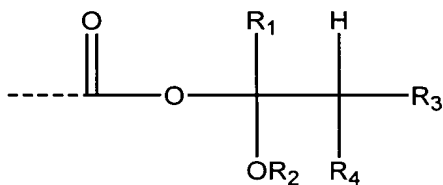


CLAIMS

What is claimed is:

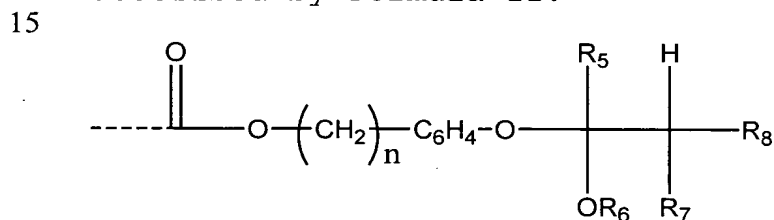
1. A positive imageable, particulate-filled photoresist composition comprising (a) at least one positive imageable photopolymer system, and (b) about 1 to about 70 vol% particulates.
2. The composition of Claim 1 wherein the particulates are selected from the group consisting of glass, oxides, carbides, nitrides, metals, metal alloys, metalloids, metalloid alloys, metal/metalloid alloys, carbon and mixtures thereof.
3. The composition of Claim 2 wherein the oxides are selected from the group consisting of aluminum oxides, silicon oxides, tin oxides and mixtures thereof.
4. The composition of Claim 1 wherein the particulates are selected from the group consisting of transition metals and their alloys.
5. The composition of Claim 4 wherein the transition metals are selected from the group consisting of Al, Cu, Ag, Au, Pt, and Pd.
6. The composition of Claim 1 wherein the particulates are selected from the group consisting of zinc, thallium, germanium, cadmium, indium, tin, antimony, lead, bismuth, and their alloys.
7. The composition of Claim 1 wherein the particulates are selected from the group consisting of metal/metalloid alloys.
8. The composition of Claim 2 wherein the carbon is in the form of carbon nanotubes.
9. The composition of Claim 1 wherein the photopolymer system is selected from the group consisting of novolac-diazonaphthoquinone resins.
10. The composition of Claim 1 wherein the photopolymer system is selected from the group of resins consisting of (meth)acrylate polymers and copolymers, wherein the resins contain pendant groups described by Formula I:



Formula I

5 wherein  $R_1$  is hydrogen or  $C_1$ - $C_6$  alkyl;  $R_2$  is  $C_1$ - $C_6$  alkyl; and  $R_3$  and  $R_4$  independently are hydrogen or  $C_1$ - $C_6$  alkyl; and wherein  $R_1$  and  $R_2$ , or  $R_1$  and  $R_3$ , or  $R_2$  and  $R_3$  may be joined to form a 5-, 6-, or 7-membered ring.

10 11. The composition of Claim 1 wherein the photopolymer system is selected from the group of resins consisting of (meth)acrylate polymers and copolymers, wherein the resins contain pendant groups described by Formula II:

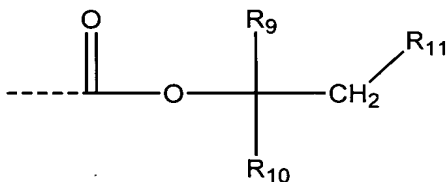


Formula II

20 wherein  $n$  is 0-4;  $R_5$  is hydrogen or  $C_1$ - $C_6$  alkyl;  $R_6$  is  $C_1$ - $C_6$  alkyl; and  $R_7$  and  $R_8$  independently are hydrogen or  $C_1$ - $C_6$  alkyl; and wherein  $R_5$  and  $R_6$ , or  $R_5$  and  $R_7$ , or  $R_6$  and  $R_7$  may be joined to form a 5-, 6-, or 7-membered ring.

25 12. The composition of Claim 1 wherein the photopolymer system is selected from the group of resins consisting of (meth)acrylate polymers and copolymers, wherein the resins contain pendant groups described by Formula III:

30



Formula III

wherein R<sub>9</sub> is hydrogen or lower alkyl; R<sub>10</sub> is lower  
 5 alkyl; and R<sub>11</sub> is hydrogen or lower alkyl; and wherein  
 a lower alkyl group includes alkyl groups having 1 to 6  
 linear or 3 to 6 cyclic carbon atoms.

13. The composition of Claim 1, wherein the  
 photopolymer system comprises acid labile monomeric  
 10 components selected from:

- tetrahydropyranyl methacrylate (or acrylate);
- tetrahydropyranyl p-vinylbenzoate;
- 1-ethoxy-1-propyl p-vinylbenzoate;
- 4-(2-tetrahydropyranyloxy)benzyl methacrylate  
 15 (or acrylate);
- 4-(1-butoxyethoxy)benzyl methacrylate (or  
 acrylate);
- t-butyl methacrylate (or acrylate);
- neopentyl methacrylate (or acrylate);
- 20 1-bicyclo{2,2,2}octyl methacrylate (or  
 acrylate) and their derivatives;
- 1-bicyclo{2,2,1}heptyl methacrylate (or  
 acrylate) and their derivatives;
- 1-bicyclo{2,1,1}hexyl methacrylate (or  
 25 acrylate) and their derivatives;
- 1-bicyclo{1,1,1}pentyl methacrylate (or  
 acrylate) and their derivatives; and
- 1-adamantyl methacrylate (or acrylate) and  
 their derivatives.

30 14. The composition of Claim 1 further comprising  
 additives selected from the group consisting of  
 solvents and viscosity aids.

15. The composition of Claim 1 wherein the particulates comprise about 20 to about 70 vol% of the composition.

5 16. The composition of Claim 1 wherein the particulates are less than 100 microns in their longest dimension.

17. The composition of Claim 1 wherein the particulates are less than 10 microns in their longest dimension.

10 18. The composition of Claim 1 in the form of a printable paste.

19. The composition of Claim 1 in the form of a film.

15 20. An electron field emitting film comprising the composition of Claim 1.

21. A field emission triode comprising the film of Claim 20.

22. A field emission display comprising the film of Claim 20.

20 23. A lighting device comprising the film of Claim 20.

24. A vacuum electronic device comprising the film of Claim 20.

25 25. A process for creating images on a substrate comprising:

- (a) depositing the composition of Claim 1 as a film on a substrate;
- (b) exposing the film imagewise to radiation to form exposed and unexposed portions thereof; and
- (c) removing the exposed portions to form a developed image.

26. The process of Claim 25 further comprising heating the developed image to form a first patterned structure.

27. The process of Claim 26 wherein forming a patterned structure comprises forming an insulator.

28. The process of Claim 26 wherein forming a patterned structure comprises forming a conductor.

29. The process of Claim 26 wherein forming a patterned structure comprises forming a semi-conductor.

5       30. The process of Claim 25 wherein the deposited film is a thick film.

31. A process according to Claim 26 further comprising depositing a composition of Claim 1, as a second film, onto the first patterned structure.

10       32. The process of Claim 31 further comprising:

(a) exposing the second film imagewise to radiation to form exposed and unexposed portions thereof; and

15       (b) removing the exposed portions to form a second developed image; and

(c) heating the second developed image to form a second patterned structure;

wherein the first and second patterned structures have the same size and shape.

20       33. A process for creating a multi-layer patterned structure comprising:

(a) depositing a first composition of Claim 1 as a first film on a substrate;

25       (b) depositing a second composition of Claim 1, as a second film, onto the first film;

(c) exposing the first and second films imagewise to radiation to form exposed and unexposed portions;

30       (d) removing the exposed portions to form a developed image.

34. The process of Claim 33 further comprising heating the developed image to form a patterned structure.

35       35. The process of Claim 34 wherein forming a patterned structure comprises forming an insulator.

36. The process of Claim 34 wherein forming a patterned structure comprises forming a conductor.

37. The process of Claim 34 wherein forming a patterned structure comprises forming a semi-conductor.

38. The process of Claim 33 wherein the deposited film is a thick film.

5        39. A process according to Claim 34 further comprising depositing a third composition of Claim 1, as a third film, onto the patterned structure.

40. A process according to Claim 25 or 33 wherein the deposition comprises screen printing, spin coating,  
10 ink jet printing, contact printing or stenciling.